REMARKS

A Petition for Extension of Time is being concurrently filed with this Amendment. Thus, this Amendment is being timely filed.

Applicants respectfully request the Examiner to reconsider the present application in view of the foregoing amendments to the claims and the following remarks.

Status of the Claims

Claims 1, 2, and 13-20 are currently pending in the present application. The Office Action is non-final. Claims 1, 2, 13 and 17 have been amended without prejudice or disclaimer. No new matter has been added by way of amendment. For instance, claims 1 and 2 have been amended to include nitrogen (N) as a required element for producing a steel rail having a high content of carbon in mass%. Support for amended claims 1 and 2 can be found at page 5, paragraph [0012], line 31. Claims 13 and 17 have been amended to include a period at the end of each claim. Thus, no new matter has been added.

Based upon the above considerations, entry of the present Amendment is respectfully requested.

Issue Under 35 U.S.C. § 103(a), Obviousness

Claims 1, 2, and 13-20 stand rejected under 35 U.S.C. § 103(a) as unpatentable to the English machine translation of JP 2002-226914 (hereinafter "JP '914"). Applicants traverse.

The Examiner asserts that the abstract and paragraph [0009] of JP '914 teach a method for producing a steel rail having a high content of carbon with an overlapping composition.

The Examiner also asserts that although JP '914 does not specifically teach Expression 1, JP '914 teaches at paragraph [0009] that the time between rolling passes (S) is 10 seconds or less and that the surface temperature of the rail (T) is 900-1050°C. Based on this, the Examiner points out, if C is 0.85 and T is 900°C (therefore CPT1=1.05), Expression 1 and $S \leq CPT1$ are satisfied.

The Examiner also alleges that JP '914 teaches claim 2. Further, since the claimed compositional ranges of claims 1 and 2 either overlap or are within the ranges disclosed by JP '914, the Examiner asserts that a *prima facie* case of obviousness exists. According to the Examiner, it would have been obvious to select the claimed steel rail composition and method from the steel rail composition and method disclosed by JP '914 since JP '914 teaches the same utility (*i.e.*, a railroad rail) in the whole disclosed range.

Regarding dependent claims 14 and 18, the abstract and paragraph [0009] of JP '914 disclose that immediately after the finish rolling step, the surface of the rail head is cooled at a cooling rate of 0.5-50 °C/s until the surface temperature reaches 800-950°C. The Examiner alleges that these ranges overlap with the ranges of claims 14 and 18.

With regards to claims 15, 16, 19, and 20, the Examiner asserts that the abstract of JP '914 teaches the steel rail is cooled to 800-950°C at a cooling rate of 0.5-50°C./s on the rail surface and then subjected to natural cooling. The Examiner alleges that the ranges overlap with the ranges of 15, 16, 19, and 20. Because of these overlaps, the Examiner contends that it would have been obvious to cool the surface of the rail head at a cooling rate of 2-30 °C/s until the surface temperature reaches a desired temperature and then allow the rail to further cool at room temperature (natural cooling) since it is known in the art to cool at a desired cooling rate first to a

desired temperature and then allow the cooling to finish naturally at room temperature as evidenced by JP '914. Applicants respectfully disagree.

Graham v. John Deere, 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), has provided the controlling framework for an obviousness analysis. A proper analysis under § 103(a) requires consideration of the four *Graham* factors of: determining the scope and content of the prior art; ascertaining the differences between the prior art and the claims that are at issue; resolving the level of ordinary skill in the pertinent art; and evaluating any evidence of secondary considerations (e.g., commercial success; unexpected results). 383 U.S. at 17, 148 USPQ at 467.

M.P.E.P. § 2143 sets forth the guidelines in determining obviousness. But before the Examiner can utilize these guidelines, the Examiner has to take into account the factual inquiries set forth in *Graham v. John Deere*; *supra*. To reject a claim based on the above mentioned guidelines, the Examiner must resolve the *Graham* factual inquiries. MPEP §2143.

If the Examiner resolves the *Graham* factual inquiries, then the Examiner has to provide some rationale for determining obviousness, wherein M.P.E.P. § 2143 sets forth the rationales that were established in *KSR Int'l Co. v Teleflex Inc.*, 82 USPQ2d 1385 (U.S. 2007).

Applicants respectfully submit that the Examiner has not appropriately resolved the *Graham* factors, including the factors of determining the scope and content of the prior art and ascertaining the differences between the prior art and the claims that are at issue. Based on the following, Applicants maintain that the above mentioned *Graham* factors actually reside in Applicant's favor. Additionally, Applicants submit that since the Examiner did not resolve the *Graham* factors, the rationale the Examiner provides for the cited reference is improper.

Applicants respectfully submit that the present invention is distinct from JP '914 and that the Examiner is basing the Examiner's assertions on hindsight reconstruction.

Applicants also respectfully submit that the Examiner has improperly applied hindsight reconstruction to reject the claims since to arrive at variables that can meet the requirements of Expression 1, the Examiner must select a specific temperature, rolling interval, and carbon content based on the present claims. The same is true for Expression 2.

The Instant Invention

The present invention comprises a method for inhibiting the growth of austenite grain caused after continuous rolling by controlling precipitation. The inventors found that the precipitation of V-carbide, V-Nitride, V-carbonitride, Nb-carbide and Nb-carbonitride generated during continuous rolling causes pinning of austenite grains, which inhibits the growth of austenite grain. In addition, the present inventors investigated the conditions where the precipitation of V-carbide, V-Nitride, V-carbonitride, Nb-carbide and Nb-carbonitride during the continuous rolling can be fully controlled.

Applicants have amended claims 1 and 2, without prejudice or disclaimer, to make the nitrogen (N) content an adequate value in the present invention. N enables the inhibition of grain growth of austenite grain by precipitating V nitride, V-carbonitride and/or Nb-carbonitride during continuous rolling. N is also an element effective in increasing both the ductility and the hardness (strength) of the pearlite structure by precipitating V nitride, V-carbonitride and/or Nb-carbonitride during the cooling process after continuous rolling. Further N is an element effective in preventing heat affected zones of welded joint parts from softening by precipitating

V nitride, V-carbonitride and/or Nb-carbonitride in the heat affected zones, which is reheated at a temperature range below the Ac1 point. In addition to the above, N is an element effective in improving the ductility of the pearlite structure by forming segregation on the austenite grain boundary, which expedites pearlite transformation from the austenite grain boundary and increases the fineness of the pearlite block size. If the N content is less than 0.0060 mass%, the effects mentioned above are very weak. If the N content is more than 0.0200 mass%, it becomes difficult to dissolve N into the steel to make a solid-solution, which generates bubbles which can be a source of fatigue damage.

Therefore, the N content is limited to 0.0060 to 0.0200% in order to generate precipitates. As described in the present specification at paragraph [0045], this amended feature is important since N as impurity in a steel rail is contained only at most 0.0050%.

Since the amended claims are limited to a N content of 0.0060 to 0.0200%, V-nitride, V-carbonitride and Nb-carbonitride can be adequately precipitated, because of appropriate quantities of N (0.0060% to 0.0200%).

Differences Between the Invention and the Prior Art

On the other hand, JP '914 does not teach that its disclosed steel may contain nitrogen (N). Applicants submit that there is a possibility that a slight amount of N may be contained as an unavoidable impurity in the steel, but the amount would be 0.0059% or less as described above. Because of this, a small amount of N cannot sufficiently generate V-nitride, V-carbonitride and Nb-carbonitride, and therefore austenite grains will be permitted to grow which will affect the quality of the steel rail.

Additionally, Applicants respectfully disagree with the Examiner that the present invention would be obvious to the skilled artisan. Due to the unpredictability in the chemical arts and the particularly unique composition of the present invention, Applicants respectfully submit that the present invention is not obvious in light of JP '914 and that the Examiner is applying hindsight reconstruction. Through a process of hindsight reconstruction using the Applicants' disclosure (*i.e.*, claims 1 and 2), which has been often rebuked by the Courts, the Examiner is improperly modifying and reconstructing the disclosures of the JP '914 reference to a point that they are taken entirely out of context to achieve the methods of the presently claimed invention. (*See, Grain Processing Corp. v. American Maize-Products Co.*, 840 F.2d 902, 907, 5 U.S.P.Q.2d 1788, 1792 (Fed. Cir. 1988), stating, "Care must be taken to avoid hindsight reconstruction by using 'the patent in suit as a guide through the maze of prior art references, combining the right references in the right way so as to achieve the result of the claims in suit,'" (internal citation omitted); and *In re Fine*, 837 F.2d 1071, 1075, 5 U.S.P.Q.2d 1596, 1600 (Fed. Cir. 1988), stating "One cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.").

The courts since *KSR Int'l Co. v Teleflex Inc.*, 82 USPQ2d 1385 (U.S. 2007), have recognized that inventors face additional barriers in relatively unpredictable technological areas as noted in *Takeda Chemical Industries, Ltd. v. Alphapharm Pty., Ltd.*, ; *supra* (since TSM test can provide helpful insight if it is not applied as rigid and mandatory formula, and since, in cases involving new chemical compounds, it remains necessary to identify some reason that would have led chemist to modify known compound, in particular manner, in order to establish *prima facie* obviousness of new compound).

As indicated above, the inventive composition of the present application limits the N content to 0.0060 to 0.0200% in order to generate V-nitride, V-carbonitride and Nb-carbonitride precipitates. As described previously, this amended feature is important since N as impurity in a steel rail is contained only at most 0.0050%, which would be inadequate amount of N to produce the above precipitates. The composition of the present invention shows specific properties based on the amount of N contained in the steel.

Since the JP '914 reference does not specifically disclose that its steel may contain N, a skilled artisan would not be motivated to modify the compositions of JP '914 to make the present invention.

In light of the above presently amended claims and remarks, because there is no disclosure, teaching, suggestion, reason or rationale provided in the JP '914 reference that would allow one of ordinary skill in the art to arrive at the instant invention as claimed, it follows that the same reference is incapable of rendering the instant invention obvious under the provisions of 35 USC § 103(a). Based upon the above, and applying the *Graham factors* analysis test, it is submitted that a *prima facie* case of obviousness has not been established.

Applicants respectfully request reconsideration and subsequent withdrawal of the above rejections.

In view of the above remarks, Applicants believe the pending application is in condition for allowance.

CONCLUSION

A full and complete response has been made to all issues as cited in the Office Action. Applicants have taken substantial steps in efforts to advance prosecution of the present application. Thus, Applicants respectfully request that a timely Notice of Allowance issue for the present case.

In view of the above remarks, it is believed that claims are allowable.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Craig A. McRobbie, Reg. No. 42,874, at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

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Respectfully submitted,

By #42874

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